

FONDO PROVINCIA



NAZIONALE

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SMITHSONIAN MISCELLANEOUS COLLECTIONS.

156

CATALOGUE

OF

MINERALS,

WITH THEIR FORMULAS, ETC.

PREPARED FOR THE SMITHSONIAN INSTITUTION.

BY

T. EGLESTON



WASHINGTON:
SMITHSONIAN INSTITUTION:

JUNE, 1863.

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ADVERTISEMENT.



THE following Catalogue of Mineral Species has been prepared by Mr. Egleston, at the request of the Institution, for the purpose of facilitating the arranging and labelling of collections, and the conducting of exchanges, as well as of presenting in a compact form an outline of the science of mineralogy as it exists at the present day.

In labelling collections it is considered important to give the chemical composition as well as the names, and hence the formulæ have been added.

Some doubt was at first entertained as to the system of classification which ought to be adopted; but after due consideration it was concluded to make use of that followed by Professor Dana, in the last edition of his *Manual of Mineralogy*. Whatever difference of opinion may exist as to the best classification, the one here employed is that which will be most generally adopted in this country, on account of the almost exclusive use of Professor Dana's excellent *Manual*.

The Institution is under obligations to Prof. Dana, Prof. Brush, Dr. Genth, and other gentlemen, for their assistance in perfecting the work, and carrying it through the press.

Copies of the Catalogue, printed on one side only, to be cut apart for labels, can be furnished on application.

JOSEPH HENRY,
Secretary S. I.

SMITHSONIAN INSTITUTION,
June, 1863.

INTRODUCTION.

To render the present Catalogue of Minerals more than a mere enumeration of names, the formulæ expressing the chemical composition of the mineral and the system in which it crystallizes, as far as at present understood, have been given. The classification adopted is Dana's, as published in the fourth edition of his Mineralogy. Some species that have proved not to be well founded have been omitted, and many since published have been added. Of these latter species, some must be considered as having only a provisional place in the series, and it is probable that others will ultimately be dropped altogether. In making the additions and corrections, the Supplements to Dana's Mineralogy, which have appeared from time to time in *Silliman's Journal*, have always been consulted, and the most probable formulæ, as deduced by recent investigations, have been selected. In a few instances a change has been made in the place of a species where a more thorough examination has thrown light upon the true nature of the mineral or where it has been found that the system of crystallization had previously been incorrectly given. *Faujasite*, p. 19, was formerly considered as *dimetric*, it has lately been proved to be *monometric*, and it has therefore been placed among the monometric zeolites. The formula for *Euclase* is the one given by Rose; Damour's analysis gave water, and the formula $2\text{H}_2\text{Si}_2 + 3\text{Al}_2\text{Si}_2 + \text{H}$. Rammelsberg has recently discovered the existence of protoxides in *Staurotide*, and proposes as a general formula $(\text{R}, \text{H}) + \text{Si}^2$. In the formula for *Opal*, water has not been written,

as it is found in very variable quantities, and is not considered as essential. For what is known of the species added to the list of organic compounds, see the 2d, 5th, 6th, and 7th Supplements to Dana's Mineralogy. For changes in the systems of crystallization, Des-Cloizeaux has generally been the authority.

A table of the symbols used, with illustrations of the meaning of the formulæ, are given on p. vii., and on p. ix. will be found a table relating to the systems of crystallization. In the first column are the simple forms from which all the others, of the same system, are derived; in the second the description of the axes of these simple forms, and in the others the nomenclature that has been adopted by the authors whose names stand at the head of the column. The axes of a crystal are imaginary lines drawn through its centre and about which it is symmetrical. It has been found most convenient to refer to the systems of crystallization by the numbers which have been placed on the left hand of the table.

An asterisk following the name of a mineral, as *Gold*,* p. 1, denotes that it has been found in the United States. A dagger, as *Danburite*,† p. 14, denotes that it has been found in the United States only. The other minerals have not, so far as is known, been found in this country.

T. EGLESTON.

New York, May, 1863.

CHEMICAL SYMBOLS.

Ag. (Argentum)	Silver.	Mg.	Magnesium.
Al.	Aluminium.	Mn.	Manganese.
Aq.	Water.	Mo.	Molybdenum.
As.	Arsenic.	N.	Nitrogen.
Au. (Aurum)	Gold.	Na. (Natrium)	Sodium.
B.	Boron.	Ni.	Nickel.
Ba.	Barium.	O.	Oxygen.
Be. (Beryllium)	Glucinum.	Os.	Osmium.
Bi.	Bismuth.	P.	Phosphorus.
Br.	Bromine.	Pb. (Plumbum)	Lead.
C.	Carbon.	Pd.	Palladium.
Ca.	Calcium.	Pt.	Platinum.
Cb.	Columbium.	Rd.	Rhodium.
Cd.	Cadmium.	Ru.	Ruthenium.
Ce.	Cerium.	S.	Sulphur.
Cl.	Chlorine.	Sb. (Stibium)	Antimony.
Co.	Cobalt.	Se.	Selenium.
Cr.	Chromium.	Si.	Silicium.
Cu. (Cuprum)	Copper.	Su. (Stannum)	Tin.
D.	Didymium.	Sr.	Strontium.
F.	Fluorine.	Ta.	Tantalum.
Fe. (Ferrum)	Iron.	Tb.	Terbium.
H.	Hydrogen.	Te.	Tellurium.
Hg. (Hydrargyrum)	Mercury.	Th.	Thorium.
I.	Iodine.	U.	Uranium.
Ir.	Iridium.	V.	Vanadium.
K. (Kalium)	Potassium.	W. (Wolframium)	Tungsten.
La.	Lanthanum.	Y.	Yttrium.
Li.	Lithium.	Zn.	Zinc.
M.	Mellie Acid.	Zr.	Zirconium.

NOTE.—R is an indefinite symbol, and may refer to any one or more of the symbols in the table. In the formulæ given in the Catalogue the dots over the symbols indicate atoms of oxygen—thus, Fe indicates one atom

of Iron combined with one of Oxygen. A dashed letter indicates a double atom of the substance—thus, Fe means two atoms of Iron combined with three of Oxygen. A general formula has sometimes been given when one or more of the elements are replaced by others in variable proportions, or for species which include several important varieties, as Melinophane, p. 12, Allanite and others, p. 14, Pyroxene, p. 11, Amphibole and Peridot, p. 12, &c. In these formulæ R represents all the bases composed of one atom of an element and one of Oxygen, and R all those composed of two atoms of an element and three of Oxygen. Thus the general formula for the family of the Chlorites, p. 17, is $5\text{R}^2\text{Si}\frac{3}{4} + 3\text{R}\text{Si}\frac{3}{4} + 12\text{H}$, which means that the mineral contains five atoms of a compound made up of three atoms of proto-base combined with three-quarters of an atom of silicic acid, plus three atoms of a compound of one atom of sesqui-base combined with three-quarters of an atom of silicic acid, plus 12 atoms of water. In Chlorite and Pennine the proto-bases are Magnesia and Iron, but in Clinocllore Magnesia only; in Chlorite and Clinocllore the sesqui-base is Alumina only, while in Pennine it is Alumina and Iron. It will thus be seen that a large figure written as a co-efficient refers to the whole of the member to which it is prefixed, while a small figure written as an exponent refers only to the symbol to which it is attached. Thus $5\text{R}^2\text{Si}\frac{3}{4}$ means five atoms of $\text{R}^2\text{Si}\frac{3}{4}$, while R^2 means simply three atoms of R . When the symbols are written together the substances are in chemical combination—thus As S which is the formula for Realgar, p. 2, characterizes that mineral as a sulphuret of Arsenic. When one element is combined with several these are placed in brackets and each symbol is followed by a comma—thus Smaltine (Co, Fe, Ni) As^2 , p. 4, is an Arseniuret of Cobalt, Iron, and Nickel. In this case the proportions of Cobalt, Iron, and Nickel are not stated. In the formula of Eisenkies ($\frac{1}{3}\text{Ni} + \frac{2}{3}\text{Fe}$) S , p. 3, a sulphuret of Nickel and Iron, the proportions are stated. The general formula in this case would be RS ; one-third of R is Nickel, and the other two-thirds Iron. When more than one element is combined with several others, both members are written in brackets; thus Glauco-dot (Co, Fe) (S, As) 2 , p. 4, is a Bi-sulpho-arsenuret of Cobalt and Iron. In some instances, as Bismuth Silver, p. 1, no formula has been given, but simply an enumeration of the elements of which the mineral is composed; in this case each symbol is followed by a comma.

When the water of a mineral has not been determined, it has been written Aq. instead of H .

SYSTEMS OF CRYSTALLIZATION.

No.	SIMPLE FORMS.	AXES.
1	Cube and octahedron.	3 axes rectangular and equal.
2	Right prism with square base.	3 axes rectangular, 2 equal.
3	Right prism with rectangular or rhombic base.	3 axes rectangular and unequal.
4	Right rhomboidal and oblique rhombic prisms.	3 axes unequal, 2 rectangular.
5	Oblique disymetric rhomboidal prism.	3 axes unequal, and unequally inclined.
6	Rhombohedron and hexagonal prism.	4 axes, 3 equal and equally inclined, 1 at right angles to the other three.

NAMES USED BY DIFFERENT AUTHORS.						
No.	Naumann.	Mohs.	Weiss & Rose.	Phillips.	Delafosse.	Dana.
1	Tesseral.	Tessular.	Regular.	Cubic.	Cubic.	Monometric.
2	Tetragonal.	Pyramidal.	2 and 1 axial.	Pyramidal.	Tetragonal.	Dimetric.
3	Rhombic.	Orthotype.	1 and 1 axial.	Prismatic.	Orthorhombic.	Trimetric.
4	Monoclinohedric.	Hemiorthotype.	2 and 1 membered.	Oblique.	Clino-rhombic.	Monoclinic.
5	Triclinohedric.	Anorthotype.	1 and 1 membered.	Anorthic.	Clino-hedric.	Triclinic.
6	Hexagonal.	Rhombohedral.	3 and 1 axial.	Rhombohedral.	Hexagonal.	Hexagonal.



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CATALOGUE OF MINERALS.

No.	Name.	Formula.	System of crystallization.
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A. NATIVE ELEMENTS.

1. *Hydrogen Group.*

1. Gold *	Au	1
2. Platinum *	Pt	1
3. Platiniridium *	Ir, Pt	1
4. Palladium	Pa	1
5. Quicksilver *	Hg	1
6. Amalgam	Ag Hg ² and Ag Hg ³	1
7. Arquerite	Ag ⁶ Hg	1
8. Gold Amalgam *	(Au, Ag) ² Hg ⁴	
9. Silver *	Ag	1
10. Bismuth Silver	Fe, Bi, Pb, Ag	1?
11. Copper *	Cu	1
12. Lead	Pb	1
13. Iron *	Fe	1
14. Tin	Sn	2
15. Zinc	Zn	6

2. *Arsenic Group.*

16. Iridosmine *	Ir, Os, Rd	6
17. Tellurium	Te	6

No.	Name.	Formula.	System of crystallization.
18.	Bismuth *	Bi	6
19.	Tetradymite *	Bi, Te	6
20.	Antimony	Sb	6
21.	Arsenic *	As	6
22.	Arsenical Antimony *	Sb, As	6
23.	Sulphur *	S	3
24.	Selenium	Se	4
25.	Selensulphur	Se, S	

3. Carbon Group.

26.	Diamond. *	C	1
27.	Mineral Coal	C	
	27 ^a . Anthracite *		
	27 ^b . Bituminous Coal *		
	27 ^c . Jet *		
	27 ^d . Lignite *		
28.	Graphite *	C	6

B. SULPHURETS, ARSENIURETS, ETC.

I. BINARY COMPOUNDS.

1. Compounds of Elements of the Arsenic Group with one another.

29.	Realgar	As S	4
30.	Orpiment *	As ³ S ³	3
31.	Dimorphine	As ⁴ S ³	3
32.	Bismuthine *	Bi ³ S ³	3
33.	Stibnite *	Sb ³ S ³	3

No.	Name.	Formula.	System of crystallization.
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2. Compounds of Elements of the Arsenic Group with those of the Hydrogen Group.

1. *Discrasite Division.*

34. Discrasite	$\text{Ag}^2 \text{Sb}$	3
35. Domeykite *	$\text{Cu}^3 \text{As}^2$	
36. Algodonite *	$\text{Cu}^6 \text{As}^2$	
37. Whitneyite *	$\text{Cu}^9 \text{As}^2$	

2. *Galena Division.*

38. Silver Glance *	Ag S	1
39. Erubescite *	$(\text{Fe}, \text{Cu}) \text{S}$	1
40. Galena *	Pb S	1
41. Steinmannite	Pb, S, Sb	1
42. Cuproplumbite ?	$2\text{Pb S} + \text{Cu S}$	1
43. Alisonite	$3\text{Cu S} + \text{Pb S}$	
44. Manganblende	Mn S	1
45. Syepoorite	Co S	
46. Eisennickelkies	$(\frac{1}{3}\text{Ni} + \frac{2}{3}\text{Fe}) \text{S}$	1
47. Clausthalite	Pb Se	1
48. Naumannite	Ag Se	1
49. Berzelianite	Cu Se	
50. Eucairite	$(\text{Cu}, \text{Ag}) \text{Se}$	
51. Hesaite *	Ag Te	1†
52. Altaite	Pb Te	1
53. Grünauite	$(\text{Bi, Ni, Co, Fe})^2 \text{S}^2$	1
54. Blende *	Zn S	1
55. Copper Glance *	Cu S	3

No.	Name.	Formula.	System of crystallization.
56.	Akanthite	Ag S	3
57.	Stromeyerite	(Cu, Ag) S	3
58.	Cinnabar *	Hg S	6
59.	Millerite *	Ni S	6
60.	Pyrrhotine *	Fe ⁷ S ⁸	6
61.	Greenockite	Cd S	6
62.	Wurtzite	Zn S	6
63.	Onofrite	Hg ⁶ Se ⁵	
64.	Copper Nickel *	Ni As	6
65.	Breithauptite *	Ni Sb	6
66.	Kaneite	Mn As	
67.	Schreibersite	Fe, P, Ni	

3. Pyrites Division.

68.	Pyrites *	Fe S ²	1
69.	Hauerite	Mn S ²	1
70.	Smaltine *	(Co, Fe, Ni) As ²	1
71.	Cobaltine	Co (S, As) ²	1
72.	Gersdorffite *	Ni (S, As) ²	1
73.	Ullmannite	Ni (S, As, Sb) ²	1
74.	Marcasite *	Fe S ²	3
75.	Rammelsbergite	Ni As ²	3
76.	Leucopyrite *	Fe As ²	3
77.	Mispickel *	Fe (As, S) ²	3
78.	Glaucoodot	(Co, Fe) (S, As) ²	3
79.	Sylvanite *	(Ag, Au) Te ²	3.
80.	Nagyagite	(Pb, Au) (Te, S) ²	2

No.	Name.	Formula.	System of crystallization.
81.	Covellite	Cu S^2	6
82.	Molybdenite *	Mo S^2	6
83.	Riolite	Ag Se^2	6?

4. Skutterudite Division.

84.	Skutterudite	Co As^2	1
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II. DOUBLE BINARY COMPOUNDS.

1. The Persulphuret a Sulphuret of an Element of the Hydrogen Group, as of Iron, Cobalt, or Nickel.

85.	Linnæite *	$\text{Co S} + \text{Co}^2 \text{S}^2$	1
86.	Cuban	$\text{Cu S} + \text{Fe}^2 \text{S}^2$	1
87.	Chalcopyrite *	$\text{Cu S} + \text{Fe}^2 \text{S}^2$	2
88.	Barnhardite *	$2\text{Cu S} + \text{Fe}^2 \text{S}^2$	2
89.	Tin Pyrites	$\text{Cu S} (\text{Sn}^2 \text{S}^2, \text{Fe}^2 \text{S}^2)$	2?
90.	Sternbergite	$\text{Ag S} + 2\text{Fe}^2 \text{S}^2?$	3

2. The Persulphuret a Sulphuret of Elements of the Arsenic Group.

91.	Wolfsbergite	$\text{Cu S} + \text{Sb}^2 \text{S}^2$	3
92.	Tannenite	$\text{Cu S} + \text{Bi}^2 \text{S}^2$	3?
93.	Berthierite	$\text{Fe S} + \text{Sb}^2 \text{S}^2$	
94.	Zinkenite	$\text{Pb S} + \text{Sb}^2 \text{S}^2$	3
95.	Miargyrite	$\text{Ag S} + \text{Sb}^2 \text{S}^2$	4
96.	Plagionite	$\text{Pb S} + \frac{3}{2}\text{Sb}^2 \text{S}^2$	4
97.	Jamesonite	$\text{Pb S} + \frac{1}{2}\text{Sb}^2 \text{S}^2$	3
98.	Heteromorphite	$\text{Pb S} + \frac{1}{2}\text{Sb}^2 \text{S}^2$	
99.	Brongniardite	$(\text{Pb}, \text{Ag}) \text{S} + \frac{1}{2}\text{Sb}^2 \text{S}^2$	1
100.	Chiviatite	$(\text{Cu}, \text{Pb}) \text{S} + \frac{1}{2}\text{Bi}^2 \text{S}^2$	

No.	Name.	Formula.	System of crystallization.
101.	Dufrenoyite	$\text{Pb S} + \frac{1}{2}\text{As}^2\text{S}^3$	1
102.	Fyrargyrite	$\text{Ag S} + \frac{1}{2}\text{Sb}^2\text{S}^3$	6
103.	Proustite *	$\text{Ag S} + \frac{1}{2}\text{As}^2\text{S}^3$	6
104.	Freieslebenite *	$(\text{Ag, Pb}) \text{S} + \frac{1}{2}\text{Sb}^2\text{S}^3$	4
105.	Bournonite	$(\text{Cu, Pb}) \text{S} + \frac{1}{2}\text{Sb}^2\text{S}^3$	3
106.	Kenngottite	Ag, Pb, S, Sb	4
107.	Boulangerite	$\text{Pb S} + \frac{1}{2}\text{Sb}^2\text{S}^3$	
108.	Alkinit	$(\text{Cu, Pb}) \text{S} + \frac{1}{2}\text{Bi}^2\text{S}^3$	3
109.	Wölchite	Pb, Cu, As, Sb, S	3
110.	Clayite ?	$(\text{Cu, Pb}) (\text{S, As, Sb})$	1
111.	Kobellite ?	$(\text{Fe, Pb}) \text{S} + \frac{1}{2}(\text{Sb, Bi})^2\text{S}^3$	1 ?
112.	Meneghinite	$\text{Pb S} + \frac{1}{2}\text{Sb}^2\text{S}^3$	
113.	Tetrahedrite *	$(\text{Cu, Fe, Zn, Ag}) \text{S} + \frac{1}{2}(\text{Sb, As})^2\text{S}^3$	1
114.	Tennantite *	$(\text{Cu, Fe}) \text{S} + \frac{1}{2}\text{As}^2\text{S}^3$	1
115.	Geocronite *	$\text{Pb S} + \frac{1}{2}(\text{Sb, As})^2\text{S}^3$	3
116.	Polybasite	$(\text{Ag, Cu}) \text{S} + \frac{1}{2}(\text{Sb, As})^2\text{S}^3$	6
117.	Stephanite	$\text{Ag S} + \frac{1}{2}\text{Sb}^2\text{S}^3$	3
118.	Enargite *	$(\text{Cu, Fe, Zn}) \text{S} + \frac{1}{2}(\text{As, Sb})^2\text{S}^3$	3
119.	Xanthocone	$(3\text{Ag S} + \text{As}^2\text{S}^3) + 2(3\text{Ag S} + \text{As}^2\text{S}^3)$	6
120.	Fireblende	Ag, S, Sb	4
121.	Wittichite	Cu, Bi, S	3

C. FLUORIDS, CHLORIDS, BROMIDS, IODIDS.

1. Calomet Division.

122.	Calomet	Hg^2Cl	2
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No.	Name.	Formula.	System of crystallization.
<i>2. Rock Salt Division.</i>			
123.	Sylvine	K Cl	1
124.	Salt *	Na Cl	1
125.	Sal Ammoniac	NH ⁺ Cl	1
126.	Kerargyrite *	Ag Cl	1
127.	Embolite	3Ag Cl + 2Ag Br	1
128.	Bromyrite	Ag Br	1
129.	Iodo-bromid of Silver	Ag, I, Br	
130.	Fluor *	Ca F	1
131.	Yttrocerite *	Ca F, YF, Ce F	
132.	Iodyrite	Ag I	6
133.	Coccinite	Hg I	2?
134.	Fluocerite	Ce, Y, HF	6
135.	Fluocerine	Ce ² F ² + 3 Ce H	1?
136.	Cotunnite	Pb Cl	3
137.	Muriatic Acid	H Cl	
138.	Cryolite	Na F + $\frac{1}{2}$ Al ³ F ³	2
139.	Chiolite	Na F + $\frac{2}{3}$ Al ³ F ³	2
140.	Fluellite	Al, F	3
141.	Carnallite	K Cl + Mg Cl + 12H	
142.	Tachhydrite	Ca Cl + 2Mg Cl + 12H	

No.	Name.	Formula.	System of crystallization.
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D. OXYGEN COMPOUNDS.

I. BINARY COMPOUNDS.

1. Oxides of the Elements of the Hydrogen Group.

A. ANHYDROUS OXIDES.

1. Monometric.

143. Periclase	Mg	1
144. Red Copper *	Cu	1
145. Martite *	Fe	1
146. Iserrine	Fe (Fe, Ti)	1
147. Irite ?	(Ir, Os, Fe) (Ir, Os, Cr) ² O ³ ?	1
148. Spinel *	* Mg Al	
149. Magnetite *	Fe Fe	1
150. Magnoferrite	† Mg ³ Fe ⁴	1
151. Franklinite *	(Fe, Zn) ³ (Fe, Mn)	1
152. Chromic Iron *	(Fe, Mg) (Al, Cr)	1
153. Pitchblende	U ⁶ ?	1
154. Melaconite *	Cu	1?
155. Plumbic Ochre *	Pb	

2. Hexagonal.

156. Water *	H	6
157. Zincite *	Zn	6
158. Corundum *	Al	6
159. Hematite *	Fe	6
160. Ilmenite *	Ti, Fe,	6
161. Plattnerite	Pb	6?
162. Tenorite	Cu	6?

* Mg may be replaced by Ca, Fe, Mn, or Zn, alone or in combination.

† Rammelsberg gives the formula Mg^m Feⁿ, and gives 3 and 4 as the probable values of m and n.

No.	Name.	Formula.	System of crystallization.
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3. *Dimetric.*

163.	Braunite *	Mn Mn	2
164.	Hausmannite *	Mn Mn	2
165.	Cassiterite *	Sn	2
166.	Rutile *	Ti	2
167.	Anatase *	Ti	2

4. *Trimetric.*

168.	Chalcotrichite *	Cu	3
169.	Chrysoberyl *	$\text{Be} + \text{Al}^2$	3
170.	Brookite *	Ti	3
171.	Pyrolusite *	Mn	3
172.	Pollanite	Mn Mn	3

Appendix to Anhydrous Oxides.

173.	Minium *	$\text{Pb}^2 \text{Pb}$	
174.	Crednerite	$\text{Cu}^3 \text{Mn}^2$	4
175.	Heteroclin?	Mn, Si	4
176.	Palladinite? *	Pa	

5. *Combinations of Oxides and Chlorides or Sulphurets.*

177.	Voltsite	$4\text{Zn S} + \text{Zn}$	
178.	Matlockite	$\text{Pb Cl} + \text{Pb}$	2
179.	Mendipite	$\text{Pb Cl} + 2\text{Pb}$	3
180.	Percyllite?	$(\text{Pb Cl} + \text{Pb}) + (\text{Cu Cl} + \text{Cu}) + \text{Ag}$	1
181.	Karelinite?	$\text{Bi} + \text{Bi S}$	

B. *HYDROUS OXIDES.*

182.	Diaspore *	Al H	3
183.	Göthite *	Fe H	3

No.	Name.	Formula.	System of crystallization.
184.	Manganite	MnH	3
185.	Limonite *	Fe^2H^2	
186.	Brucite *	MgH	6
187.	Gibbsite *	AlH^3	6

Appendix to Hydrous Oxides.

188.	Völknerite *	$Mg^2Al + 16H$	6
189.	Hydrotalcite	$Mg^2Al + 12H$	
190.	Pellomelane *	$(Mn, Ba) Mn^2 + H$	
191.	Newkirkite	Mn, Fe, H	
192.	Wad *	$* R Mn + H$	
193.	Atacamite	$CuCl + 3CuH$	3

2. Oxides of Elements of the Arsenic Group.

1. Arsenic Division.

194.	Arsenolite *	As	1
195.	Senarmontite	Sb	1
196.	Valentinite	Sb	3
197.	Bismuth Ochre *	Bi	
198.	Kermesite	$2SbS^3 + Sb$	4
199.	Retzbanyite	$(3BiS + 2CuS, PbS) + 2PbS$	
200.	Cervantite	$Sb + Sb$	
201.	Volgerite	$Sb + 5H$	
202.	Ammiolite	Hg, Sb, Fe, H	

2. Sulphur Division.

203.	Sulphurous Acid *	S	
204.	Telluric Ochre	$Te?$	

* $R = K, Ba, Co, Mn.$

No.	Name.	Formula.	System of crystallization.
205.	Sulphuric Acid *	SH	
206.	Wolframine *	W	1
207.	Molybdine *	Mo	3
3. Oxygen Compounds of Carbon, Boron and Silicon.			
208.	Carbonic Acid *	O	
209.	Bassolin	BH^3	5
210.	Quartz *	Si	6
	210 ^a . Jasper *		
	210 ^b . Agate *		
	210 ^c . Chalcedony *		
211.	Opal *	Si	
	211 ^a . Precious opal		
	211 ^b . Semi-opal *		
	211 ^c . Hyalite *		
	211 ^d . Geyselite		

II. OXYGEN DOUBLE BINARY COMPOUNDS.

1. Silicates.

A. ANHYDROUS SILICATES.

1. *Edelforsite Section.*

212. **Edelforsite** CaSi

2. *Augite Section.*

213. **Wollastonite *** Ca^2Si^2 4

214. **Pyroxene** R^2Si^2 4

214^a. Diopside * $(\text{Ca}, \text{Mg})^2\text{Si}^2$

214^b. Hedenbergite * $(\text{Ca}, \text{Fe})^2\text{Si}^2$

214^c. Augite * $(\text{Ca}, \text{Mg}, \text{Fe})^2\text{Si}^2$

215. **Pelicanite** $\text{AlSi}^2 + 2\text{H}$

No.	Name.	Formula.	System of crystallization.
216.	Spodumene *	$(\text{Li}, \text{Na})^2 \text{Si}^2 + 4\text{Al Si}^2$	4
217.	Prehnitoid	$(\text{Na}, \text{Ca})^2 \text{Si}^2 + 2\text{Al Si}^2$	
218.	Amphibole	$\text{R}^2 \text{Si}^2$	4
218 ^a .	Tremolite *	$(\text{Ca} + 3\text{Mg}) \text{Si}^2$	
218 ^b .	Actinolite *	$(\text{Ca} + 3(\text{Mg}, \text{Fe})) \text{Si}^2$	
218 ^c .	Hornblende *	$(\text{Fe} + 3\text{Mg}) \text{Si}^2$	
219.	Acmite	$\text{Na Si} + \text{Fe Si}^2$	4
220.	Strakonitzite ?	$\text{Ca}, \text{Mg}, \text{Fe}, \text{Al}, \text{Si}, \text{H}$	4
221.	Enstatite	$\text{Mg}^2 \text{Si}^2$	3
222.	Anthophyllite *	$(\text{Fe} + 3\text{Mg}) \text{Si}^2$	3
223.	Hypersthene *	$(\text{Fe}, \text{Mn})^2 \text{Si}^2$	3
224.	Wichtyne	$(\text{Na}, \text{Ca}, \text{Mg}, \text{Fe})^2 \text{Si} + \text{Al Si}^2$	
225.	Babingtonite *	$(\text{Ca}, \text{Fe})^2 \text{Si}^2$	5
226.	Rhodonite *	$\text{Mn}^2 \text{Si}^2$	5
227.	Beryl *	$(\frac{1}{3}\text{Be} + \frac{1}{3}\text{Al}) \text{Si}^2$	6
228.	Eudialyte	$2(\text{Ca}, \text{Na}, \text{Fe})^2 \text{Si}^2 + \text{Zr Si}^2$	6

3. *Eulytine Section.*

229.	Eulytine	$\text{Be}^2 \text{Si}^2$	1
230.	Leucophane	$\text{Ca}^2 \text{Si}^2 + \text{Be Si} + \text{Na F}$	3
231.	Mellinophane	$* \text{R}^2 \text{Si}^2 + \text{H Si} + \text{Na F}$	6?

4. *Garnet Section.*

232.	Peridot	$\text{R}^2 \text{Si}$	3
232 ^a .	Forsterite *	$\text{Mg}^2 \text{Si}$	
232 ^b .	Chrysolite *	$(\text{Mg}, \text{Fe})^2 \text{Si}$	
232 ^c .	Fayalite *	$\text{Fe}^2 \text{Si}$	

* $\text{R} = \text{Ca}, \text{Na}$. $\text{H} = \text{Al}, \text{Be}$

No.	Name.	Formula.	System of crystallization.
233.	Tephroite *	$Mn^2 Si$	2?
234.	Knebelite	$(Fe, Mn)^2 Si$	
235.	Chondrodite *	$Mg^2 Si$	3
236.	Willemite *	$Zn^2 Si$	6
237.	Phenacite *	$Be Si$	6
238.	Garnet	$R^2 Si + R Si$	1
	238 ^a . Pyrope *	$(Ca, Mg)^2 Si + (Al, Fe) Si$	
	238 ^b . Grossular *	$Ca^2 Si + Al Si$	
	238 ^c . Almandine *	$Fe^2 Si + Al Si$	
	238 ^d . Spessartine *	$Mn^2 Si + Al Si$	
	238 ^e . Melanite *	$Ca^2 Si + Fe Si$	
	238 ^f . Uvarovite	$Ca^2 Si + (Cr Al) Si$	
239.	Helvin	$(Mn, Fe)^2 Si^2 + Be Si + Mn S$	1
240.	Zircon *	$Zr Si$	2
241.	Auerbachite	$Zr_2 Si_3$	2
242.	Aivite ?	$Th?, Y, Zr, Fe, Al, Be, Si, H$	2
243.	Tachyphalinite	$Th?, Al, Fe, Zr, Si, H$	2
244.	Idocrase *	$(Ca, Mg, Fe)^2 Si + Al Si$	2
245.	Sarcosite	$(Ca, Na)^2 Si + Al Si$	2
246.	Melionite	$Ca^2 Si + 2 Al Si$	2
247.	Scapolite *	$Ca^2 Si^2 + 2 Al Si$	2
248.	Meililitite	$2(Ca, Na, Mg)^2 Si + (Al, Fe) Si$	2
249.	Dipyre	$4(Ca, Na) Si + 3 Al Si$	2

* Part of the oxygen is replaced by fluorine in varying proportions.

No.	Name.	Formula.	System of crystallization.
250.	Epidote	$R^2Si + 2H Si$	5
	250°. Pistacite *	$(Ca, Fe)^2Si + 2Al Si$	
	250°. Zoisite *	$Ca^2Si + 2Al Si$	
	250°. Piedmontite	$Ca^2Si + 2(Al, Mn) Si$	
251.	Allanite *	$* R^2Si + H Si$	4
252.	Partschin	$(Fe, Mn)^2Si + Al Si$	4
253.	Zoisite Brooke	$Ca^2Si + 2Al Si$	4
254.	Gadolinite	$\dagger (R, H) Si_2$	4
255.	Danburite †	$Ca^2Si + 3B Si$	5
256.	Axinite *	$\dagger (R, H, B) Si$	5
257.	Iolite *	$(Mg, Fe)^2Si^2 + 3Al Si$	3

5. Mica Section.

258.	Muscovite *	$\S (K, R) Si_2$	3
259.	Phlogopite *	$3(K, Mg)^2Si + 2Al Si$	3
260.	Biotite *	$(K, Mg)^2Si + (Al, Fe) Si$	3?
261.	Astrophyllite	$K, Na, Ca, Fe, Mn, Ti, Al, Zr, Fe, Si$	
262.	Lepidomelane	$(K, Fe)^2Si + 3(Al, Fe) Si$	3?
263.	Lepidolite *	$(K, Li) Si + (Al, Fe) Si$	3

6. Feldspar Section.

264.	Sodalite *	$Na^2Si + 3Al Si + Na Cl$	1
265.	Lapis Lazuli	Na, Ca, Al, Fe, Si, S	1
266.	Häuyne	$Na^2Si + 3Al Si + 2Ca S$	1
267.	Nosean	$Na^2Si + 3Al Si + Na S$	1
268.	Skolopsite	$\parallel R^2Si^2 + Al Si + \frac{1}{2}Na S$	

* R = Ca. Ce. La. Di. Fe. Mg. R = Al Fe † R = Ca. Ce. Fe. Y. R = Be.

† R = Ca. R = Al. Fe. Mn. § R = Al. Fe.

‖ R = Na. Ka. Ca. Mg. Mn.

No.	Name.	Formula.	System of crystallization.
269.	Leucite	$K^2 Si^2 + 3Al Si^2$	1
270.	Nepheline *	$(Na, K)^2 Si + 2Al Si$	6
271.	Canorinite *	$Na^2 Si + 2Al Si + (Na, Ca) O + H_2O$	6
272.	Anorthite	$(Na, K, Ca, Mg)^2 Si + 3Al Si$	5
273.	Andesine *	$(Ca, Na)^2 Si^2 + 3Al Si^2$	5
274.	Barsowite	$Ca^2 Si^2 + 3Al Si$	5?
275.	Bytownite ?	$Ca^2 Si^2 + 3Al Si$	
276.	Labradorite *	$(Ca, Na) Si + Al Si$	5
277.	Oligoclase *	$(Ca, Na) Si + Al Si^2$	5
278.	Albite *	$Na Si + Al Si^2$	5
279.	Orthoclase *	$K Si + Al Si^2$	4
280.	Petalite *	$(Li, Na)^2 Si^2 + 4Al Si^2$	5?

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281.	Cyclopite	$(Ca, Na)^2 Si + 2(Al, Fe) Si$	5
282.	Weissigite ?	Na, K, Li, Al, Si	4
283.	Pollux	K, Na, Al, Fe, Si	
284.	Isopyre	$Ca Si + (Al, Fe) Si$	
285.	Silicate of Yttria ?	Y, Si	
286.	Polychrollite	Mg, Al, Fe, Si, H	6?

7. Andalusite Section.

287.	Gehlenite	$3(Mg, Ca)^2 Si + (Fe, Al)^2 Si$	2
288.	Andalusite *	$* Al Si_2$	3
289.	Topaz *	$* Al Si_2$	3
290.	Staurotide *	$\dagger (Al, Fe) Si_2$	3
291.	Carolathine	$Al Si_2$	

* And $Al Si_2$. In Topaz part of the oxygen is replaced by fluorine.

† And $Al Si_2$. Rammelsberg writes the formula $(R, H)^2 + Si^2$.

No.	Name.	Formula.	System of crystallization.
292.	Lievrite *	$3(\text{Fe}, \text{Ca})^2 \text{Si} + \text{Fe}^2 \text{Si}$	3
293.	Kyanite *	Al Si_2	5
294.	Sillimanite *	* Al Si_2	3
295.	Sapphirine	$\text{Mg}, \text{Fe}, \text{Al}, \text{Si}$	3†
296.	Eucrase	$(\frac{1}{2}\text{Fe} + \frac{1}{2}\text{Al}) \text{Si}_2$	4
297.	Sphene *	$(\text{Ca}, \text{Ti}) \text{Si}_2$	4
298.	Keilhauite	$(\text{Y}, (\text{Ca}, \text{Ti}), \text{Al}, \text{Fe}, \text{Mn}, \text{Cr}) \text{Si}_2$	4
299.	Tourmaline *	† $(\text{R}^2, \text{B}, \text{B}) \text{Si}_2$	6

B. HYDROUS SILICATES.

I. Magnesian Hydrous Silicates.

1. Talc Section.

300.	Talc *	$\text{Mg}^2 \text{Si}^2 + 2\text{H}$	3†
301.	Meerschaum *	$\text{Mg Si} + \text{H}?$	
302.	Neolite	$(\text{Fe}, \text{Mg}) \text{Si} + \frac{1}{2}\text{H}?$	
303.	Spadaite	$\text{Mg}^2 \text{Si}^4 + 4\text{H}$	
304.	Chlorophæite	$\text{Fe Si} + 6\text{H}?$	
305.	Crocidolite	$(\text{Na}, \text{Mg}, \text{Fe})^2 \text{Si}^2 + 2\text{H}$	4†

2. Serpentine Section.

306.	Picrophyll	$(\text{Mg}, \text{Fe})^2 \text{Si}^2 + 2\text{H}$	6†
307.	Kerolite *	$\text{Mg}^2 \text{Si}^2 + 4\frac{1}{2}\text{H}$	
308.	Monradite	$(\text{Mg}, \text{Fe})^2 \text{Si}^2 + \frac{1}{2}\text{H}$	
309.	Aphrodite	$\text{Mg}^2 \text{Si}^2 + 2\frac{1}{4}\text{H}$	
310.	Picrosmine	$\text{Mg}^2 \text{Si}^2 + 1\frac{1}{2}\text{H}$	3
311.	Saponite *	$2\text{Mg}^2 \text{Si}^2 + \text{Al Si} + 10\text{H}$	

* And Al Si_2 .

† R = Fe. Mg. Ca. Na. H = Al. Fe.

No.	Name.	Formula.	System of crystallisation.
312.	Serpentine *	$\text{Mg}^2 \text{Si}^4 + 6\text{H}$	3 ?
313.	Deweylite *	$\text{Mg}^2 \text{Si} + 3\text{H}$	
314.	Hydrophite *	$(\text{Mg}, \text{Fe})^2 \text{Si} + 3\text{H} ?$	
315.	Nickel Gymnite *	$(\text{Ni}, \text{Mg})^2 \text{Si} + 3\text{H}$	

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316.	Ottrelite *	$(\text{Fe}, \text{Mn})^3 \text{Si}^2 + 2\text{Al Si} + 3\text{H}$	4 ?
317.	Groppite	$(\text{K}, \text{Ca}, \text{Mg})^3 \text{Si}^2 + 2\text{Al Si} + 3\text{H}$	
318.	Stilpnomelane	$\text{Fe}^3 \text{Si}^2 + \text{Al Si}^2 + 7\text{H}$	
319.	Chalcodite †	$2(\text{Fe}, \text{Mg}) \text{Si} + (\text{Al}, \text{Fe}) \text{Si} + 3\text{H}$	
320.	Eukamptite	$(\text{Mg}, \text{Fe})^3 \text{Si} + \text{Al Si} + \text{H}$	
321.	Melanhydrite	$(\text{Mg}, \text{Fe}, \text{Mn})^3 \text{Si}^2 + 2(\text{Al}, \text{Fe}) \text{Si} + 12\text{H}$	

3. Chlorite Section.

322.	Hisingerite	$\text{Fe}^3 \text{Si} + 2\text{Fe Si} + 6\text{H}$	
323.	Thuringite *	$2\text{Fe}^3 \text{Si} + (\text{Al}, \text{Fe})^3 \text{Si} + 6\text{H}$	
324.	Euphyllite †	$(\text{Na}, \text{K}, \text{Ca})^3 \text{Si} + 8\text{Al Si} + 6\text{H}$	
325.	Pyrosclerite *	$2\text{Mg}^3 \text{Si} + \text{Al Si} + 6\text{H}$	6 ?
326.	Pseudophite ?	$4(\text{Mg}, \text{Fe})^2 \text{Si} + \text{Al}^2 \text{Si} + 9\text{H}$	
327.	Thermophyllite ?	$\text{Mg}^2 \text{Si}_2 + (\text{Al}, \text{Fe}) \text{Si}_2 + 2\text{H}$	
328.	Chlorite	$5\text{R}^2 \text{Si}_2 + 3\text{R Si}_2 + 12\text{H}$	6
328 ^a .	Chlorite *	$5(\text{Mg}, \text{Fe})^3 \text{Si}_2 + 3\text{Al Si}_2 + 12\text{H}$	
328 ^b .	Pennine	$5(\text{Mg}, \text{Fe})^3 \text{Si}_2 + 3(\text{Al}, \text{Fe}) \text{Si}_2 + 12\text{H}$	
328 ^c .	Clinoclora *	$5\text{Mg Si}_2 + 3\text{Al Si}_2 + 12\text{H}$	
329.	Defessite	$(\text{Mg}, \text{Fe})^3 \text{Si}_2 + (\text{Al}, \text{Fe}) \text{Si}_2 + 3\text{H}$	6 ?
330.	Ripidolite <i>G. Rose</i>	$(\text{Mg}, \text{Fe})^3 \text{Si}_2 + \text{Al Si}_2 + 3\text{H}$	6
331.	Clintonite *	$\text{Ca}, \text{Mg}, \text{Fe}, \text{Al}, \text{Si}, \text{H}$	
332.	Chloritoid *	$(\text{Fe}, \text{Mg})^3 \text{Si}_2 + 2\text{Al Si}_2 + 3\text{H}$	

No.	Name.	Formula.	System of crystallization.
333.	Cronstedtite	$(\text{Mg, Fe, Mn})^2 \text{Si}_2 + \text{FeSi}_2 + 3\text{H}$	6
334.	Sideroschistolite	$\text{Fe}^2 \text{Si}_2 + \frac{1}{2}\text{H}$	6
335.	Margarite *	$(\text{Na, Ca})^2 \text{Si} + 3\text{Al}^2 \text{Si} + 3\text{H}$	3
336.	Ephesite	$\text{Na, K, Ca, Al, Si, H}$	

II. Non-Magnesian Hydrous Silicates.

1. Pyrophyllite Section.

337.	Pyrophyllite *	$\text{AlSi}^2 + 1\frac{1}{2}\text{H}$	8
338.	Pholerite *	$\text{Al}^2 \text{Si}^4 + 6\text{H}$	
339.	Anthosiderite	$\text{FeSi}^2 + \text{H}$	

2. Pectolite Section.

340.	Apophyllite *	$(\text{Ca, K})^2 \text{Si}^2 + 2\text{H}$	2
341.	Pectolite *	$(\text{Ca, Na})^4 \text{Si}^2 + \text{H}$	4
342.	Okenite	$\text{Ca}^2 \text{Si}^4 + 6\text{H}$	3†
343.	Laumontite *	$\text{Ca}^2 \text{Si}^2 + 3\text{AlSi}^2 + 12\text{H}$	4
344.	Leonhardite *	$\text{Ca}^2 \text{Si}^2 + 3\text{AlSi}^2 + 9\text{H}$	4
345.	Catapleilite	$(\text{Na, Ca})^2 \text{Si}^2 + 2\text{ZrSi}^2 + 6\text{H}$	6
346.	Diopase	$\text{Cu}^2 \text{Si}^2 + 3\text{H}$	6
347.	Chrysocolla *	$\text{Cu}^2 \text{Si}^2 + 6\text{H}$	
348.	Demidoffite	Cu, Si, H	
349.	Pyrosmalite	$*4(\text{R}^2 \text{Si} + 2\text{R}^2 \text{Si}^2 + 6\text{H}) + 3\text{FeCl}$	6
350.	Portite	$\text{AlSi}^2 + 2\text{H}$	3

3. Calamine Section.

351.	Tritomite	$\dagger \text{HSi} + 2\text{H}^\dagger$	1
352.	Thorite	$\text{Th}^2 \text{Si} + 3\text{H}$	2
353.	Cerite	$(\text{Ce, La, Di})^2 \text{Si} + \text{H}$	6

* R = Fe, Mn.

† H = Ce, La.

No.	Name.	Formula.	System of crystallization.
354.	Calamine *	$Zn^2 Si + 1\frac{1}{2} H$	3
355.	Prehnite *	$Ca^2 Si + Al Si + H$	3
356.	Chlorastrolite †	$(Ca, Na)^2 Si + 2(Al, Fe) Si + 3H$	
357.	Savite	$(Na, Mg)^2 Si^2 + Al Si + 2H$	3
358.	Schneiderite	$3(Ca, Mg)^2 Si^2 + Al^2 Si^2 + 3H$	
359.	Carpholite	$(Al, Fe, Mn) Si + 1\frac{1}{2} H$	3
4. Zeolite Section.			
360.	Analcime *	$Na^2 Si^2 + 3Al Si^2 + 6H$	1
361.	Ittnerite	$(Na, Ca)^2 Si + 3Al Si + 6H$	1
362.	Faujasite	$(Na, Ca) Si + Al Si^2 + 9H$	1
363.	Chabazite *	$(Ca, Na, K)^2 Si^2 + 3Al Si^2 + 18H$	6
364.	Gmelinite	$(Ca, Na, K)^2 Si^2 + 3Al Si^2 + 18H$	6
365.	Levyne	$Ca Si + Al Si + 4H$	6
366.	Gismondine	$(Ca, K)^2 Si + 2Al Si + 9H$	2
367.	Edingtonite	$3Ba Si + 4Al Si + 12H$	2
368.	Harmotome	$Ba Si + Al Si^2 + 5H$	3
369.	Phillipsite	$(Ca, K) Si + Al Si^2 + 5H$	3
370.	Thomsonite *	$(Ca, Na)^2 Si + 3Al Si + 7H$	3
371.	Natrolite *	$Na Si + Al Si + 2H$	3
372.	Scolecite	$Ca Si + Al Si + 3H$	4
373.	Ellagitite	$Ca^2 Si^2 + Al Si + 12H$	4?
374.	Sloanite	$(Ca, Mg)^2 Si^2 + 5Al Si + 9H$	3
375.	Epistilbite	$(Ca, Na) Si + Al Si^2 + 5H$	3
376.	Heulandite *	$Ca Si + Al Si^2 + 5H$	4
377.	Brewsterite	$(Sr, Ba) Si + Al Si^2 + 5H$	4
378.	Stilbite *	$Ca Si + Al Si^2 + 6H$	3
379.	Caporcianite	$Ca^2 Si^2 + 3Al Si^2 + 9H$	4

No.	Name.	Formula.	System of crystallization.
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5. *Datholite Section.*

380. Datholite *	$2\text{Ca}^2\text{Si} + \text{B}^2\text{Si}^2 + 3\text{H}$	4
381. Allophane *	$\text{Al}^3\text{Si}^2 + 15\text{H}$	
382. Schrötterite *	$\text{Al}^4\text{Si} + 3\text{H}$	

Appendix to Hydrous Silicates.

383. Chloropal	$\text{FeSi}^2 + 3\text{H}$	
384. Collyrite	$\text{Al}^3\text{Si} + 15\text{H}$	
385. Wolchonskoite	$* \text{RSi} + 2\frac{1}{2}\text{H} ?$	
386. Chrome Ochre	$(\text{Al}, \text{Cr})^2\text{Si}^4 + 4\text{H}$	
387. Pimelite	$(\text{Ni}; \text{Mg})^3\text{Si} + 2(\text{Al}, \text{Fe})\text{Si} + 9\text{H}$	
388. Montmorillonite	$\text{Ca}, \text{K}, \text{Al}, \text{Fe}, \text{Si}, \text{H}$	
389. Delanovite ?	$\text{Mn}^3\text{Si}^2 + 2\text{AlSi}^2 + 45\text{H}$	
390. Erdmanite	$\text{Ca}, \text{Fe}, \text{Mn}, \text{Y}, \text{Ce}, \text{La}, \text{Al}, \text{Si}, \text{H}$	
391. Bavalite	$\text{Ca}, \text{Mg}, \text{Al}, \text{Fe}, \text{Si}, \text{H}$	

C. UNARRANGED SILICATES CONTAINING TITANIC ACID.

392. Tscheffkinite	$((\text{Ca}, \text{Ti}), \text{Ce}, \text{La}, \text{Al})\text{Si}\frac{1}{2}$	
393. Schorlomite †	$\dagger 2\text{R}^2\text{Si}\frac{1}{2} + 3\text{HSi}\frac{1}{2}$	1
394. Mosandrite	$\dagger \text{R}^2\text{Si} + 2\text{RSi} + 4\frac{1}{2}\text{H}$	3
395. Wöhrerite	$6(\text{Na}, \text{Ca})^3\text{Si} + 32\text{rSi} + \text{CbSi}$	3

Appendix.

396. Turnerite ?	$\text{Ca}, \text{Mg}, \text{Al}, \text{Si} ?$	4
* R = Cr. Al. Fe. † R = Ca. R = (Ca. Ti). Fe.		
† R = Ca. R = (Ca. Ti). Ce. B. La.		

No.	Name.	Formula.	System of crystallization.
2. Titanates, Tungstates, Molybdates, Tantalates, Columbates, Chromates, Vanadates.			
397. Perovskite		Ca Ti	1
398. Pyrochlore *		$4(\text{Ca, Mg, Ce, La, Y, U}) (\text{Ti, U})$	1
399. Pyrrhite		Ce, Zr, U	1
400. Scheelite *		Ca W	2
401. Scheelite *		Pb W	2
402. Tungstate of Copper ? †		Cu, Ca, W	
403. Wulfenite *		Pb Mo	2
404. Azorite		Ca, U	2
405. Fergusonite.		$(\text{Y, Ce})^* \text{U}$	2
406. Tyrite ?		$\text{Y, Ce, Fe, U, Al, U}$	2
407. Adelpholite		Fe, Mn Ta	2
408. Tantalite		$(\text{Fe, Mn}) \text{Ta}$	3
409. Wolfram *		$2\text{FeW} + 3\text{MnW}$ and $4\text{FeW} + \text{MnW}$	3
410. Columbite *		$(\text{Fe, Mn}) \text{U}$	3
411. Paracolumbite ? †		$\text{Fe, U, and a metallic acid.}$	
412. Samarskite *		$\text{Y, Ce, La, Fe, U, U}$	3
413. Mengite		Fe, Zr, Ti	3
414. Polymignyte *		$\text{Y, Ti, Zr, Fe, U, U}$	3
415. Polycrase		$\text{U, Ti, Zr, Fe, U, U}$	3
416. Æschynite		$2(\text{Ce, La, Y, Fe}) \text{U} + \text{U, Ti}$	3
417. Euxenite		$\text{Ca, Mg, Y, Ce, La, U, Ti, U}$	3?
418. Yttrio-Tantalite		$* \text{R}^? (\text{Ta, W, U})$	3
419. Parathorite †		$\text{Fe, Ti}^?$	3
420. Rutherfordite †		Ce, Y, Ca, Ti	4

* In the yellow R = Y. In the black R = Y, Ca, Fe. In the brown R = Y, Ca.

No.	Name.	Formula.	System of crystallization.
421.	Crocoisite	Pb Cr	4
422.	Vauquelinite *	$(\text{Cu, Pb})^2 \text{Cr}^2$	4
423.	Melanochoisite	$\text{Pb}^2 \text{Cr}^2$	3?
424.	Dechenite	$2(\text{Pb, Zn})^2 \text{V} + (\text{Pb, Zn})^2 \text{As}$	
425.	Descloisite	$\text{Pb}^2 \text{V}$	3
426.	Vanadinite	$\text{Pb}^2 \text{V} + \frac{1}{2} \text{Pb Cl}$	6
427.	Volborthite	$(\text{Cu, Cs})^2 \text{V} + \text{H}$	6
428.	Pateraite ?	Cu, Co, V	

3. Sulphates and Selenates.

1. ANHYDROUS SULPHATES.

1. *Trimetric.*

429.	Glaserite	K S	3
430.	Thenardite	Na S	3
431.	Barytes *	Ba S	3
432.	Celestine *	Sr S	3
433.	Anhydrite *	Ca S	3
434.	Anglesite *	Pb S	3
435.	Almagrerite	Zn S	3
436.	Leadhillite *	$\text{Pb S} + 3\text{Pb O}$	3
437.	Caledonite *	Pb S, Pb O, Cu O	3

2. *Rhombohedral.*

438.	Dreelite	$\text{Ca S} + 3\text{Ba S}$	6
439.	Susannite	$\text{Pb S} + 3\text{Pb O}$	6

3. *Monoclinic.*

440.	Glauberite	$(\frac{1}{2}\text{Na} + \frac{1}{2}\text{Ca}) \text{S}$	4
441.	Lanarkite	$\text{Pb S} + \text{Pb O}$	4

No.	Name.	Formula.	System of crystallization.
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Appendix to Anhydrous Sulphates.

442. Reussin	Na S, Mg S, Ca Cl	
443. Selenate of Lead	Pb Se	1?
444. Connellite	Cu S, Cu Cl?	6
445. Alumian	Al S^2	6?

2. HYDROUS SULPHATES.

446. Misenite	$\text{K S} + \text{H S}$	
447. Polyhalite	$(\text{K, Ca, Mg}) \text{S} + \frac{1}{2} \text{H}$	3
448. Gypsum *	$\text{Ca S} + 2 \text{H}$	4
449. Astrakanite	$\text{Na S} + \text{Mg S} + 4 \text{H}$	
450. Löweite	$\text{Na S} + \text{Mg S} + 2 \frac{1}{2} \text{H}$	
451. Mascagnine	$\text{NH}^4 \text{S} + \text{H}$	3
452. Lecontite	$(\text{Na, NH}^4) \text{S} + 2 \text{H}$	3
453. Coquimbite	$\text{Fe S}^3 + 9 \text{H}$	6
454. Roemerite	$(\text{Fe, Zn}) \text{S} + \text{Fe S}^3 + 12 \text{H}$	4
455. Cyanosite *	$\text{Cu S} + 5 \text{H}$	
456. Cyanochrome	$(\frac{1}{2} \text{K} + \frac{1}{2} \text{Cu}) \text{S} + 3 \text{H}$	4
457. Picromerid	$(\text{Mg, Cu}) \text{S} + 3 \text{H}$	4
458. Alunogen *	$\text{Al S}^3 + 18 \text{H}$	
459. Alum	$\text{R S} + \text{Al S}^3 + 24 \text{H}$	1
459 ^a . Potash Alum *	$\text{K S} + \text{ " "}$	
459 ^b . Solfatarite	$\text{Na S} + \text{ " "}$	
459 ^c . Tschermigite	$\text{NH}^4 \text{S} + \text{ " "}$	
459 ^d . Pickeringite	$\text{Mg S} + \text{ " "}$	
459 ^e . Halotrichite *	$\text{Fe S} + \text{ " "}$	
459 ^f . Apjohnite *	$\text{Mn S} + \text{ " "}$	

No.	Name.	Formula.	System of crystallization.
460.	Voltaite	$\text{Fe S} + \text{Fe S}^3 + 24\text{H}$	1
461.	Epsomite *	$\text{Mg S} + 7\text{H}$	3
462.	Tauriscite ?	$\text{Fe S} + 7\text{H}$	3
463.	Mangan Vitriol ?	Mn, S, H	
464.	Goslarite	$\text{Zn S} + 7\text{H}$	
465.	Copperas *	$\text{Fe S} + 7\text{H}$	4
466.	Bieberite	$(\text{Co, Mg}) \text{S} + 7\text{H}$	4
467.	Pyromeline *	Ni, S, H	6?
468.	Morenosite	Ni, S, H	
469.	Johannite	$2(\text{U O}) \text{S} + (\text{Cu S}) + 4\text{H}$	4
470.	Basic Sulphate of Uranium	$2(\text{U O})^3 \text{S}^2 + (\text{Ca, Cu}) \text{S} + 10\text{H}$	
471.	Glauber Salt *	$\text{Na S} + 10\text{H}$	4
472.	Botryogen	$\text{Fe}^3 \text{S}^2 + 3\text{Fe S}^2 + 36\text{H}$	4
473.	Copiapite	$\text{Fe}^2 \text{S}^3 + 18\text{H}$	
474.	Apatelite	$2\text{Fe}^3 \text{S}^3 + 3\text{H}$	
475.	Alunite *	$\text{K S} + 3\text{Al S} + 6\text{H}$	6
476.	Jarosite	$\text{K S} + 4\text{Fe S} + 9\text{H}$	6
477.	Websterite	$\text{Al S} + 9\text{H}$	
478.	Loewigite	$\text{K S} + 3\text{Al S} + 9\text{H}$	
479.	Pissophane	$(\text{Fe, Al})^3 \text{S}^3 + 30\text{H}$	
480.	Linarite	$\text{Pb S} + \text{Cu H}$	4
481.	Brochantite *	$\text{Cu}^4 \text{S} + 3\text{H}$	3
482.	Lettsomite	$(\text{Cu}^6 \text{S} + 3\text{H}) + (\text{Al S} + 9\text{H})$	
483.	Medjidite	$\text{U S} + \text{Ca S} + 15\text{H}$	
484.	Uranochre	$3\text{U}^3 \text{S} + 14\text{H}$ and $2\text{U}^3 \text{S} + \text{Ca S} + 25\text{H}$	
485.	Uranochalcite	$\text{U O} + 2\text{Ca S} + \text{Cu S} + 18\text{H}$	

No.	Name.	Formula.	System of crystallization.
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4. Borates.

486. Boracite	$2(\text{Mg}^3 \text{B}^4) + \text{Mg Cl}$	1
487. Rhodizite	$\text{Ca}^3 \text{B}^4 ?$	1
488. Hydroboracite	$\text{Ca}^3 \text{B}^4 + \text{Mg}^3 \text{B}^4 + 18 \text{H}$	
489. Hayesine	$\text{Ca B}^4 + 10 \text{H}$	
490. Boronatrocalcite	$\text{Na B}^4 + \text{Ca}^3 \text{B}^4 + 12 \text{H}$	
491. Borax *	$\text{Na B}^3 + 10 \text{H}$	4
492. Lagonite	$\text{Fe B}^3 + 3 \text{H}$	
493. Larderellite	$\text{NH}^4 \text{B}^4 + 4 \text{H}$	
494. Warwickite †	Mg, Fe, Ti, B	4

5. Phosphates, Arsenates, Antimonates, Nitrates.

a. ANHYDROUS.

1. Hexagonal.

495. Apatite *	$\text{Ca}^3 \text{P} + \frac{1}{2} \text{Ca (Cl, F)}$	6
496. Hydroapatite	$\text{Ca}^3 \text{P} + \frac{1}{2} \text{Ca F} + \text{H}$	
497. Cryptolite	$\text{Ce}^3 \text{P}$	6
498. Pyromorphite *	$\text{Pb}^3 \text{P} + \frac{1}{2} \text{Pb Cl}$	6
499. Mimetene *	$(\text{Pb, Ca})^3 (\text{As, P}) + \frac{1}{2} \text{Pb Cl}$	6

2. Dimetric.

500. Xenotime *	$(\text{Y, Ce})^3 \text{P}$	2
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3. Monoclinic.

501. Monazite *	$(\text{Ce, La, Th})^3 \text{P}$	4
502. Wagnerite	$\text{Mg}^3 \text{P} + \text{Mg F}$	4
503. Kühnite	$(\text{Ca, Mg, Mn})^3 \text{As}$	
504. Lazulite *	$2(\text{Mg, Fe})^3 \text{P} + \text{Al}^3 \text{P} + 5 \text{H}$	4
505. Turquoise *	$\text{Al}^3 \text{P} + 5 \text{H}$	
506. Conarite ?	Ni, P, H	4?

No.	Name.	Formula.	System of crystallization.
<i>4. Trimetric.</i>			
507. Triphylite *		$(\text{Fe}, \text{Mn}, \text{Li})^3 \text{P}$	3
508. Triplite		$(\text{Mn}, \text{Fe})^4 \text{P}$	3
509. Fischerite		$\text{Al}^2 \text{P} + 8\text{H}$	3
<i>Appendix.</i>			
510. Hopeite		$\text{Zn}, \text{P}, \text{Aq}$	3
511. Amblygonite *		$(2(\text{Li}, \text{Na})^2 \text{P} + 2\text{AlP}) + (\text{Al}^2 \text{F}^3 + \text{Al})$	3
512. Herderite		$\text{Al}, \text{Ca}, \text{P}, \text{F}$	3
513. Carminite		$\text{Pb}^2 \text{As} + 5\text{Fe As}$	3?
514. Romeine		$\text{Ca}^2, \text{Sb}, \text{Sb}$	2
<i>b. Hydrous.</i>			
515. Thrombolite		$\text{Cu}^2 \text{P}^2 + 6\text{H}?$	
516. Stercorite		$(\text{Na}, \text{NH}') \text{P} + 9\text{H}$	
517. Struvite		$\text{NH}^4 \text{Mg}^2 \text{P} + 12\text{H}$	
518. Haldingerite		$\text{Ca}^2 \text{As} + 4\text{H}$	3
519. Pharmacolite		$\text{Ca}^2 \text{As} + 6\text{H}$	4
520. Vivianite *		$\text{Fe}^2 \text{P} + 8\text{H}$	4
521. Erythrine *		$\text{Co}^2 \text{As} + 8\text{H}$	4
522. Hörnesite		$\text{Mg}^2 \text{As} + 8\text{H}$	4
523. Roesslerite		$\text{Mg}^2 \text{As} + 15\text{H}$	
524. Annabergite *		$\text{Ni}^2 \text{As} + 8\text{H}$	
525. Köttigite		$(\text{Zn}, \text{Co}, \text{Ni})^2 \text{As} + 8\text{H}$	4
526. Symplectite		$3\text{Fe As}^2 + 8\text{H}$	4
527. Trichalcite		$\text{Cu}^2 \text{As} + 5\text{H}$	
528. Scorodite *		$\text{Fe As} + 4\text{H}$	3
529. Libethenite		$\text{Cu}^2 \text{P} + \text{H}$	3

No.	Name.	Formula.	System of crystallization.
530.	Olivenite	$\text{Cu}^1 (\bar{\text{As}}, \bar{\text{P}}) + \bar{\text{H}}$	3
531.	Coniochalcite	$(\text{Cu}, \bar{\text{Ca}})^4 (\bar{\text{P}}, \bar{\text{As}}) + 1\frac{1}{2}\bar{\text{H}}$	
532.	Euchroite	$\text{Cu}^4 \bar{\text{As}} + 7\bar{\text{H}}$	3
533.	Arseniosiderite	$\bar{\text{Ca}}^6 \bar{\text{As}} + 4\text{Fe}^2 \bar{\text{As}} + 15\bar{\text{H}}$	1
534.	Pharmacosiderite	$\text{Fe}^6 \bar{\text{As}}^3 + 18\bar{\text{H}}$	1
535.	Wavellite *	$\bar{\text{Al}}^3 \bar{\text{P}}^2 + 12\bar{\text{H}}$	3
536.	Caoxene *	$\text{Fe}^2 \bar{\text{P}} + 12\bar{\text{H}}$	
537.	Childrenite *	$((\bar{\text{Mg}}, \bar{\text{Fe}}, \bar{\text{Mn}})^3, \bar{\text{Al}})^4 \bar{\text{P}}^2 + 15\bar{\text{H}}$	3
538.	Erinite	$\text{Cu}^5 \bar{\text{As}} + 2\bar{\text{H}}$	
539.	Cornwallite	$\text{Cu}^5 \bar{\text{As}} + 5\bar{\text{H}}$	
540.	Phosphochalcite *	$\text{Cu}^5 \bar{\text{P}} + 2\frac{1}{2}\bar{\text{H}}$	3
541.	Tagilite	$\text{Cu}^4 \bar{\text{P}} + 3\bar{\text{H}}$	
542.	Tyrolite	$\text{Cu}^3 \bar{\text{As}} + 10\bar{\text{H}} + \bar{\text{Ca}} \bar{\text{O}}?$	3
543.	Devauxene	$\text{Fe}^2 \bar{\text{P}} + 24\bar{\text{H}}$	
544.	Dufrenite *	$\text{Fe}^2 \bar{\text{P}} + 2\frac{1}{2}\bar{\text{H}}$	3
545.	Aphanite	$\text{Cu}^4 \bar{\text{As}} + 3\bar{\text{H}}$	4
546.	Chalcophyllite	$\text{Cu}^4 \bar{\text{As}} + 12\bar{\text{H}}$	6
547.	Liroconite	$5\text{Cu}^5 \bar{\text{As}} + \bar{\text{Al}}^3 \bar{\text{P}} + 75\bar{\text{H}}$	4
548.	Uranite *	$(\bar{\text{Ca}}, \bar{\text{U}})^2 \bar{\text{P}} + 12\bar{\text{H}}$	3
549.	Chalcolite	$(\text{Cu}, \bar{\text{U}})^2 \bar{\text{P}} + 8\bar{\text{H}}$	2
550.	Carphosiderite	$\text{Fe}, \bar{\text{P}}, \bar{\text{H}}$	
551.	Plumbo Resinite	$\bar{\text{Pb}}^2 \bar{\text{P}} + 6\bar{\text{Al}} \bar{\text{H}}$	
552.	Calcoferrite	$6(\bar{\text{Ca}}, \bar{\text{Mg}}), 3(\bar{\text{Al}}, \bar{\text{Fe}}), 4\bar{\text{P}}, 20\bar{\text{H}}$	

Sulphato-Phosphates.

553.	Pitticite Haus *	$\text{Fe}^3 \bar{\text{S}}^1 + 2\text{Fe} \bar{\text{As}} + 24\bar{\text{H}}$
554.	Diadochite	$\text{Fe}^3 \bar{\text{P}}^2 + 2\text{Fe} \bar{\text{S}}^2 + 36\bar{\text{H}}$

No.	Name.	Formula.	System of crystallization.
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Appendix.

555.	Lindackerite?	$2\text{Cu}^2\text{As} + \text{Ni}^2\text{S} + 8\text{H}^+$	3
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c. NITRATES.

556.	Nitrammite *	NH^4N	1
557.	Nitre *	K N	3
558.	Nitratine	Na N	6
559.	Nitrocalcite *	$\text{Ca N} + \text{H}$	

6. Carbonates.

1. *Anhydrous Carbonates.*

560.	Calcite *	Ca O	6
561.	Magnesite *	Mg O	
562.	Dolomite *	$(\text{Ca}, \text{Mg}) \text{O}$	6
563.	Brunnerite	$(\text{Mg}, \text{Fe}, \text{Mn}) \text{O}$	
564.	Chalybite *	Fe O	6
565.	Diallogite *	Mn O	6
566.	Smithsonite *	Zn O	6
567.	Aragonite *	Ca O	3
568.	Witherite	Ba O	3
569.	Strontianite *	Sr O	3
570.	Bromlite	$\text{Ba O} + \text{Ca O}$	3
571.	Manganocalcite	$\text{Mn O}, \text{Fe O}, \text{Ca O}, \text{Mg O}$	3?
572.	Cerussite *	Pb O	3
573.	Barytocalcite	$\text{Ba O} + \text{Ca O}$	4

2. *Hydrous Carbonates.*

574.	Bicarbonate of Ammonia	$\text{NH}^4 \text{O}^2 + \text{H}$	
575.	Trona *	$\text{Na}^2 \text{O}^2 + 4\text{H}$	4

No.	Name.	Formula.	System of crystallization.
576.	Thermonatrite	$\text{Na } \bar{\text{C}} + \text{H}$	3
577.	Natron *	$\text{Na } \bar{\text{C}} + 10\text{H}$	4
578.	Gay-Lussite	$\text{Na } \bar{\text{C}} + \text{Ca } \bar{\text{C}} + 5\text{H}$	4
579.	Lanthanite *	$\text{La } \bar{\text{C}} + 3\text{H}$	3
580.	Hydromagnesite *	$\text{Mg}^+ \bar{\text{C}}^+ + 4\text{H}$	4
581.	Hydrocalcite	$\text{Ca } \bar{\text{C}} + 5\text{H}$	6
582.	Malachite *	$\text{Cu}^+ \bar{\text{C}} + \text{H}$	4
583.	Azurite *	$2\text{Cu } \bar{\text{C}} + \text{Cu } \text{H}$	4
584.	Aurichalcite *	$2(\text{Zn}, \text{Cu}) \bar{\text{C}} + 3(\text{Zn}, \text{Cu}) \text{H}$	
585.	Zinc Bloom *	$\text{Zn}^+ \bar{\text{C}} + 3\text{H}$	
586.	Emerald Nickel *	$\text{Ni}^+ \bar{\text{C}} + 6\text{H}$	
587.	Remingtonite †	$\text{Co } \bar{\text{C}} + \text{Aq} ?$	
588.	Zippeite *	$\text{Fe } \bar{\text{S}}^+ + 12\text{H}$ and $\text{Fe } \bar{\text{S}}^+ + \text{Cu } \bar{\text{S}} + 12\text{H}$	
589.	Liebigite	$\text{Fe } \bar{\text{C}} + \text{Ca } \bar{\text{C}} + 20\text{H}$	
590.	Voglite	$2\text{U } \bar{\text{C}} + \text{Ca } \bar{\text{C}} + \text{Cu}^+ \bar{\text{C}}^+ + 14\text{H}$	
591.	Bismutite *	$\text{Bi}^+ \bar{\text{C}}^+ \text{H}^+$	

3. Carbonates with a Chloride or Fluoride.

592.	Parisite	$8(\text{Ce}, \text{La}, \text{D}) \bar{\text{C}} + 2\text{CaF} + (\text{Ce}, \text{La}, \text{D}) \text{H}^+ 6$	
593.	Kischtimite	$3\text{La } \bar{\text{C}} + \text{Ce}^+ (\text{Fl}, \text{O})^+ + \text{H}$	
594.	Cerasine	$\text{Pb Cl} + \text{Pb } \bar{\text{C}}$	2

7. Oxalates.

595.	Whewellite	$\text{Ca } \bar{\text{O}} + \text{H}$	4
596.	Oxalite	$2\text{Fe } \bar{\text{O}} + 3\text{H}$	
597.	Thierschite	$\text{Ca}, \bar{\text{O}}$	

No.	Name.	Formula.	System of crystallization.
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E. RESINS AND ORGANIC COMPOUNDS.

598. Amber *	$C^{10}H^8O$	
599. Copalite	$C^{20}H^{12}O$	
600. Middletonite	$C^{30}H^{10} + H$	
601. Retinite *		
602. Scleretinite	$C^{10}H^7O$	
603. Guyaquillite	$C^{20}H^{10}O^2$	
604. Piauzite		
605. Walchowite	$C^{12}H^9O$	
606. Bitumen *	C^8H^5	
607. Idrialite	$C^{12}H^{14}O$	
608. Pyropissite		
609. Brewstoline	$O?$	
610. Elaterite *	C, H	
611. Scheererite	$CH^2?$	4
612. Könlite	C^4H	
613. Fichtelite	C^4H^3	4
614. Könleinite	$C^{10}H^{13}$	
615. Hartite	C^8H^5	4
616. Hartine	$C^{20}H^{17}O^2$	8
617. Ixolyte		
618. Hatchettine	C, H	
619. Ozocerite	C, H	
620. Chiasmatine		
621. Dopplerite.	$C^8H^4O^2$	

No.	Name.	Formula.	System of crystallization.
622. Dinite			
623. Hircine			
624. Jaulingite			
625. Melanchyme			
626. Anthracoxene			
627. Baikerite			
628. Krantzité			
629. Mellite		$Al\bar{M}^3 + 18H$	2

CHECK LIST OF MINERALS.

- | | | |
|---------------------------------|---------------------|---------------------|
| 1. Gold * | 30. Orpiment * | 63. Onofrite |
| 2. Platinum * | 31. Dimorphine | 64. Copper Nickel * |
| 3. Platiniridium * | 32. Bismuthine * | 65. Breithauptite * |
| 4. Palladium | 33. Stibnite * | 66. Kaneite |
| 5. Quicksilver | 34. Discrasite | 67. Schreibersite |
| 6. Amalgam | 35. Domeykite * | 68. Pyrites * |
| 7. Arquerite | 36. Algodonite * | 69. Hauerite |
| 8. Gold Amalgam * | 37. Whitneyite * | 70. Smaltine * |
| 9. Silver * | 38. Silver Glance * | 71. Cobaltine : |
| 10. Bismuth Silver | 39. Erubescite * | 72. Gersdorffite * |
| 11. Copper * | 40. Galena * | 73. Ullmannite |
| 12. Lead | 41. Steinhannite | 74. Marcasite * |
| 13. Iron | 42. Cuproplumbite ? | 75. Rammelsbergite |
| 14. Tin | 43. Alisonite | 76. Leucopyrite * |
| 15. Zinc | 44. Manganblende | 77. Mispickel * |
| 16. Iridosmine * | 45. Syepoorite | 78. Glaucodot |
| 17. Tellurium | 46. Eisennickelkies | 79. Sylvanite * |
| 18. Bismuth * | 47. Clausthalite | 80. Nagyagite |
| 19. Tetradymite * | 48. Naumannite | 81. Covellite |
| 20. Antimony | 49. Berzelianite | 82. Molybdenite * |
| 21. Arsenic * | 50. Eucairite | 83. Riolite |
| 22. Arsenical Anti- | 51. Hessite * | 84. Skutterudite |
| 23. Sulphur * [mony * | 52. Altaite | 85. Linnæite * |
| 24. Selenium | 53. Grünauite | 86. Cuban |
| 25. Selensulphur | 54. Blende * | 87. Chalcopyrite * |
| 26. Diamond * | 55. Copper Glance * | 88. Barnhardite * |
| 27. Mineral Coal | 56. Akanthite | 89. Tin Pyrites |
| 27 ^a . Anthracite * | 57. Stromeyerite | 90. Sternbergite |
| 27 ^b . Bituminous | 58. Cinnabar * | 91. Wolfsbergite |
| 27 ^c . Jet * [Coal * | 59. Millerite * | 92. Tannenite |
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